

What is claimed is:

1. A zoom lens comprising three lens groups, in order from the object side, as follows:

a first lens group of negative refractive power;

a second lens group of positive refractive power; and

a third lens group of positive refractive power;

wherein

the first lens group includes, in order from the object side, a lens element of negative refractive power and a lens element of positive refractive power;

the second lens group includes a lens component of positive refractive power, a lens component that includes a first lens element of positive refractive power that is intimately bonded to a second lens element of negative refractive power, a lens component of negative refractive power, and a stop for controlling the amount of light that passes through the zoom lens;

the distance between the third lens group and an image plane of the zoom lens remains substantially constant during zooming while the zoom lens is focused at infinity, the third lens group includes a lens component having positive refractive power, and the third lens group moves toward the object side from a reference position during focusing from infinity to a near point;

at least two lens surfaces of each of the first and second lens groups are aspheric;

the first and the second lens groups are moved so that the first and second lens groups become closer together and so that the second and third lens groups become farther apart during zooming from the wide-angle end to the telephoto end;

and the following conditions are satisfied:

$$0.4 < f_w / |f_1| < 0.6$$

$$0.25 < f_2 / f_3 < 0.45$$

where

f_w is the focal length of the zoom lens at the wide-angle end,

f_1 is the focal length of the first lens group,

28 f_2 is the focal length of the second lens group, and
 29 f_3 is the focal length of the third lens group.

1 2. The zoom lens of claim 1, wherein:
 2 said lens element having negative refractive power of the first lens group has an image-
 3 side lens surface that is concave and has at least one aspheric lens surface;
 4 said lens element having positive refractive power of the first lens group has a meniscus
 5 shape with its convex lens surface on the object side;
 6 and the following conditions are satisfied:
 7 $N_{d1} > 1.72$
 8 $v_{d1} - v_{d2} > 14$
 9 where
 10 N_{d1} is the refractive index at the d-line ($\lambda = 587.6$ nm) of the lens material of said lens
 11 element having negative refractive power of the first lens group,
 12 v_{d1} is the Abbe number at the d-line ($\lambda = 587.6$ nm) of the lens material of said lens
 13 element having negative refractive power of the first lens group, and
 14 v_{d2} is the Abbe number at the d-line ($\lambda = 587.6$ nm) of the lens material of said lens
 15 element having positive refractive power of the first lens group.

1 3. The zoom lens of claim 1, wherein each of the object-side lens surface and the image-side
 2 lens surface of said lens element having negative refractive power of the first lens group is
 3 aspheric.

1 4. The zoom lens of claim 2, wherein each of the object-side lens surface and the image-side
 2 lens surface of said lens element having negative refractive power of the first lens group is
 3 aspheric.

1 5. The zoom lens of claim 3, wherein:

said second lens group includes a lens element that has positive refractive power, that has at least one aspheric lens surface, and that is situated on the object side of all other lens elements of the second lens group;

said second lens group includes a lens element that has negative refractive power, that has at least one aspheric lens surface, that is situated on the image side of the second lens group, and that has a concave lens surface on its image side;

said stop is situated on the object side of the second lens group;

and the following conditions are satisfied:

$$(N_{d3} + N_{d4}) / 2 > 1.65$$

$$v_{d4} - v_{d5} > 20$$

where

N_{d3} is the refractive index at the d-line ($\lambda = 587.6$ nm) of the lens material of the lens element having positive refractive power of the second lens group that is situated closest to the object side,

N_{d4} is the refractive index at the d-line ($\lambda = 587.6$ nm) of the lens material of the lens element of positive refractive power in the second lens group that is intimately bonded to a lens element of negative refractive power,

v_{d4} is the Abbe number at the d-line ($\lambda = 587.6$ nm) of the lens material of the lens element of positive refractive power in the second lens group that is intimately bonded to a lens element of negative refractive power, and

v_{d5} is the Abbe number at the d-line ($\lambda = 587.6$ nm) of the lens material of the second lens element in the second lens group that is intimately bonded.

6. The zoom lens of claim 5, wherein both lens surfaces of the image-side lens element of the second lens group are aspheric.

7. The zoom lens of claim 1, wherein the first lens group consists of two lens components.

- 1 8. The zoom lens of claim 7, wherein the first lens group consists of two lens elements.
- 1 9. The zoom lens of claim 1, wherein the second lens group includes only three lens
2 components.
- 1 10. The zoom lens of claim 9, wherein the second lens group includes only four lens elements.
- 1 11. The zoom lens of claim 1, wherein the third lens group consists of one lens component.
- 1 12. The zoom lens of claim 11, wherein the third lens group consists of one lens element.
- 1 13. The zoom lens of claim 7, wherein the second lens group includes only three lens
2 components, and the third lens group consists of one lens component.
- 1 14. The zoom lens of claim 1, wherein the zoom lens is formed of only three lens groups.
- 1 15. The zoom lens of claim 2, wherein the zoom lens is formed of only three lens groups.
- 1 16. The zoom lens of claim 3, wherein the zoom lens is formed of only three lens groups.
- 1 17. The zoom lens of claim 4, wherein the zoom lens is formed of only three lens groups.
- 1 18. The zoom lens of claim 5, wherein the zoom lens is formed of only three lens groups.
- 1 19. The zoom lens of claim 7, wherein the zoom lens is formed of only three lens groups.
- 1 20. The zoom lens of claim 14, wherein the first lens group consists of two lens components, the
2 second lens group includes only three lens components, and the third lens group consists of one
3 lens component.